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PRE-APPEAL BRIEF REQUEST FOR REVIEW

Docket Number (Optional): 01313/100F022-US3

Application Number	Filed
10/722,923 Conf. #1897	November 24, 2003
First Named Inventor	
Roger B. Harding et al.	
Art Unit	**Examiner**
1623	E. N. White

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).
Note: No more than five (5) pages may be provided.

I am the

- [ ] applicant /inventor.
- [ ] assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)
- [x] attorney or agent of record. Registration number 48,008
- [ ] attorney or agent acting under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34.

Signature

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August 17, 2007
Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

Docket No.: 01313/100F022-US3
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Roger B. Harding et al.

Application No.: 10/722,923 Confirmation No.: 1897

Filed: November 24, 2003 Art Unit: 1623

For: CELLULOSE ETHERS AND METHOD OF PREPARING THE SAME Examiner: E. N. White

REASONS IN SUPPORT OF PRE-APPEAL BRIEF REQUEST FOR REVIEW

MS AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Applicants respectfully request reconsideration of this application in view of the following reasons in support of applicant's Pre-Appeal Brief Request for Review. Claims 1-50 and 55-73 are pending. Because claims 3, 6, 8, 44, 45, 47-50, 55-70, 72, and 73 have been withdrawn from consideration, only claims 1, 2, 4, 5, 7, 9-43, 46 and 71 are at issue.

In the Final Office Action dated April 18, 2007, claims 1, 10, 11, 14-19, 35-43, 46, and 71 were rejected under 35 U.S.C. §102(b) as anticipated by Ohnaka (U.S. Patent No. 4,063,018) and claims 2, 4, 5, 7, 9, 12, 13, and 20-34 were rejected under 35 U.S.C. §103(a) as obvious over Ohnaka in view of European Patent Publication No. EP 879,827 (EP '827). The Examiner contends that Comparative Examples 1-3 (col. 7-8) in Ohnaka anticipate the specified claims. EP '827 is relied on to show that the preparation of CMC from bleached sulphite softwood pulp is well known in the art.

Argument

It is respectfully submitted that the rejections under 35 U.S.C. §§102(b) and 103(a) are clearly improper based upon omission of a process step necessary for a *prima facie* rejection. The claims presently under examination recite a two-step process: (a) obtaining mercerized and recovered cellulose, and then (b) converting the cellulose from step (a) into a cellulose ether. *See* claims 1 and 71. Step (a) is neither disclosed nor suggested in the cited references.

The cellulose in step (a) is mercerized and recovered. Mercerization involves adding a mercerizing agent, typically sodium hydroxide, to the cellulose (page 6, line 29, to page 7, line 4 of the specification). Recovery involves removing or neutralizing most or all of the mercerizing agent in the mixture (page 8, lines 3-4; *see also* page 8, lines 19-21). Mercerization and recovery of the cellulose as recited in step (a) of claim 1 converts the cellulose from a first form, known as native cellulose or cellulose I, to a second crystal form, known as cellulose II (page 6, lines 27-28). While treatment with the mercerizing agent produces an alkali cellulose, it is the removal of the mercerizing agent that produces the final irreversible transformation to cellulose II. *See* Crystalline Alkali-Cellulose Complexes as Intermediates During Mercerization by Sarko et al, page 169-177, 176 written as Chapter 9 of The Structures of Cellulose, Rajai H. Atalla, Editor, ACS Symposium Series Volume 340, American Chemical Society, Washington, DC, 1987; Kolpak et al., *Polymer*, 19:123-131, 123 (Feb. 1978).

In step (b), the cellulose from step (a) is converted into a cellulose ether, such as carboxymethyl cellulose (CMC). The conventional conversion process involves mercerizing and etherifying the cellulose (page 12, lines 19-22). The etherification process is performed in the presence of the mercerizing agent. For instance, the cellulose ether can be formed by adding a mercerizing agent (e.g., sodium hydroxide) to form an alkali cellulose and then adding an etherifying agent (e.g., monochloroacetic acid). Thus, when the conventional conversion process is used in the presently claimed process, the cellulose is mercerized twice: once to convert the cellulose to cellulose II and a second time to form an alkali cellulose which is then etherified. The flow chart below provides a side-by-side comparison of the presently claimed process to the process in Ohnaka.

Process of the Present Invention	Prior Art Process (Ohnaka)
Mercerization (step (a))	
↓	
Recovery (step (a)) (Cellulose II formed)	
↓	
Conversion of Cellulose II to CMC by:	Conversion of Native Cellulose to CMC by:
Mercerization to form an alkali cellulose (step (b))	Mercerization to form an alkali cellulose
↓	↓
Etherification (step (b))	Etherification
↓	↓
Cellulose ether (such as carboxymethyl cellulose (CMC))	CMC

Both Ohnaka and EP '827 disclose the "conventional" process for converting cellulose into a cellulose ether, i.e., etherification of the cellulose in the presence of a mercerizing agent. Both Ohnaka and EP '827 use native cellulose (cellulose I) in their processes. Neither reference discloses or suggests mercerizing and recovering the cellulose prior to the conversion process (i.e., forming a cellulose ether from cellulose II).

Additionally, neither Ohnaka nor EP '827 disclose or suggest a process for preparing cellulose ethers involving two mercerization steps. In the examples in Ohnaka cited by the Examiner (comparative examples 1-3), cellulose pulp was pulverized, sodium hydroxide was added to the pulverized cellulose pulp to form an alkali cellulose, and monochloroacetic acid was added to etherify the cellulose. A mercerizing agent (i.e., sodium hydroxide) was only added once, in contrast to the presently claimed process. Furthermore, in Ohnaka there is no washing or other recovery step following mercerization and prior to etherification with monochloroacetic acid. As a result, the cellulose which is used to form an alkali cellulose in Ohnaka is native cellulose (cellulose I), not cellulose II as in the presently claimed process.

Because the cited references do not disclose or suggest preparing cellulose ethers by mercerizing and recovering cellulose pulp before converting it into a cellulose ether, a *prima facie* case of anticipation or obviousness has not been established.

Additionally, the cellulose ethers, including CMC, produced by the presently claimed process exhibit significantly higher viscosities than those produced by the conventional etherification process. The viscosity of a CMC prepared by any process is dependent, *inter alia*, on the starting cellulose. For example, CMC produced from cotton linters pulp generally has a higher viscosity than that prepared under the same process conditions from southern hardwood kraft pulp.

For any given starting cellulose pulp, the process of the present invention yields a CMC having a significantly higher solution viscosity than a CMC produced by the typical prior art method of preparing CMC by simply alkalating and etherifying cellulose pulp as described in Ohnaka and EP '827. Tables 1-4 on the sheets attached to the February 1, 2007 response show the viscosity of CMC's prepared as described in Examples 1-5, 7, 9, and 10 of the present application from various starting cellulose pulps, including never-dried and re-wetted cellulose pulps which had been converted from cellulose I to cellulose II by mercerization and recovery. The control for each example was prepared by the same procedure but without mercerizing and recovering the cellulose prior to alkalation and etherification (i.e., by forming cellulose ethers from cellulose I).

Tables 1-4 show that CMC's produced by the process of the present invention have significantly higher viscosities than CMC's produced by prior art processes. For example, Table 1 shows that when a cotton linter pulp starting material is mercerized and recovered prior to alkalating and etherifying, the viscosity of the CMC formed increases by at least 102%. Table 4 shows that when a sulfite pulp starting material is mercerized and recovered prior to alkalating and etherifying, the viscosity of the CMC formed increases by at least 104%.

Neither Ohnaka nor EP '827 disclose or suggest that the viscosity of a cellulose ether can be increased by mercerizing and recovering the cellulose before converting it into the cellulose ether.

In the April 18th Final Office Action, the Examiner stated that he did not find the arguments presented in the February 1, 2007 response persuasive because the presently claimed method purportedly (1) does not require two mercerization steps, and (2) does not recite removal or neutralization of most or all of the mercerizing agent as argued. Contrary to the Examiner's contention, when the conventional process for converting cellulose to cellulose ethers is employed,

the presently claimed process mercerizes the cellulose twice, as discussed above. Furthermore, the first step of the presently claimed process (referred to as step (a) below) requires recovery of the cellulose, i.e., removal or neutralization of most or all of the mercerizing agent (page 8, lines 3-4, of the specification).

For the foregoing reasons, Ohnaka does not anticipate, and Ohnaka alone or in combination with EP '827 does not render obvious the presently claimed process. Accordingly, applicants respectfully request withdrawal of these rejections.

For at least the foregoing reasons, withdrawal of the rejections to claims 1, 10, 11, 14-19, 35-43, 46, and 71 under 35 U.S.C. §102(b) and and claims 2, 4, 5, 7, 9, 12, 13, and 20-34 under 35 U.S.C. §103(a) is respectfully requested.

CONCLUSION

It is respectfully submitted that the application is in condition for allowance.

Dated: August 17, 2007

Respectfully submitted,

By _____

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